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ABSTRACT

Prospective remembering (remembering to carry out specific activities at some future time) was investigated in this study. This investigation focused on episodic prospective remembering (memory for actions performed either infrequently or on an irregular basis) rahter than habitual prospective remembering (memory for actions routinely engaged in). Subjects included 41 5-year-old and 41 7-year-old children. Each child was asked to take an envelope when returning to the classroom, and was then distracted for seven minutes. Remembering was compared in three different conditions: in the cue condition, children were provided with an appropriate picture to use as an external retrieval cue; in the elaboration condition, children were also coached in the use of the cue; a third condition was a control. No significant differences were found among these conditions. A greater number of 7-year-olds than 5-year-olds remembered (p less than .001). Thus the results suggest that young children do not take advantage of external retrieval cues to facilitate episodic prospective remembering, at least when the task and conditions are those of the present investigation.
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PROSPECTIVE REMEMBERING AND EXTERNAL RETRIEVAL CUES

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ABSTRACT

Prospective remembering, remembering to carry out specific activities at some future time, was investigated by asking children to remember to take an envelope when returning to the classroom. This investigation focused on episodic prospective remembering, i.e., memory for actions performed either infrequently or on an irregular basis, rather than habitual prospective remembering, memory for actions which are routinely engaged in. The subjects included 41 5-year-old and 41 7-year-old children. Each child was asked to take an envelope when returning to the classroom, and was then distracted for 7 minutes. Remembering was compared in three different conditions: in the cue condition children were provided with an appropriate picture to use as an external retrieval cue; in the elaboration condition children were also coached in the use of the cue; a third condition was a control. No significant differences were found between these conditions. A greater number of 7-year-olds than 5-year-olds remembered ($p < .001$). Thus the results suggest that young children do not take advantage of external retrieval cues to facilitate episodic prospective remembering, at least when the task and conditions are those of the present investigation.

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SUMMARY

Prospective remembering, remembering to carry out specific activities at some future time, was investigated by asking 5- and 7-year-old children to remember to take an envelope when returning to the classroom. Children at both ages were able to choose an appropriate mnemonic cue for future action. A greater number of 7-year-olds than 5-year-olds remembered. No significant differences were found between a control condition and conditions designed to facilitate prospective remembering through the provision of an external retrieval cue.

A. INTRODUCTION

In remembering, one engages in various cognitive activities in order to reconstruct information which was known in the past. Not infrequently, such information has implications for actions to be performed in the future, such as stopping at the store on the way home, or keeping an appointment with the dentist. Remembering which involves such implications can be termed prospective remembering and can be distinguished from retrospective remembering, which is concerned solely with the recall of information about the past. For example, in order to deliver a message one must remember not only the message (retrospective) but also to seek out the person for whom the message is intended and to deliver the message (prospective). Although there has been considerable research directed at understanding the processes which enable us to recall information about

the past, there has been little investigation of how it is that we remember to carry out specific actions in the future.

Prospective remembering, because of the emphasis upon performance of actions rather than recall of information, is closely related to at least two other broad areas of behavior. First, prospective remembering is an important feature of those behaviors which we refer to as planned. Second, the ability to remember such actions ought to bear upon one's self-concept as an efficient, reliable, or well-organized individual. Munsat (6), for example, suggests that "If a person makes memory claims about what he did in the past, and they are frequently wrong, we say his memory is unreliable. If a person . . . forgets to do things he said he would do and is in general 'forgetful,' it is he that we brand as unreliable" (p. 18). Indeed, adults reflecting upon their children's or their own memory lapses often appear more concerned with instances of forgetting to carry out actions than with the forgetting of information about the past.

The context within which prospective remembering occurs must be considered in analyzing the cognitive activities which might facilitate prospective remembering. For example, remembering to carry out an action at a short distance in time from the present may be no different than the problem of maintaining one's vigilance or attention--e.g., remembering to transfer clothes from the washer to the dryer. Two major categories of prospective remembering which ought to be distinguished, however, may be termed habitual and episodic. In the case of habitual remembering, the activity is one which is routinely engaged in--e.g., remembering to brush one's teeth before going to bed at night. Remembering, or the performance of the activity, may be guided by cues in the immediate

environment or by cues from preceding activities. A strategy for facilitating prospective remembering is to integrate the desired activity within the stream of our daily activities--e.g., we plan to take our vitamin pills at breakfast each day, rather than at random times on different days.

Episodic remembering, on the other hand, involves an action which is performed either infrequently or on an irregular basis, so that the performance of the action is dependent upon remembering to carry out the action--e.g., buying bread on the way home from work. Of course, whether a particular activity is said to involve episodic or habitual remembering can depend upon the success of the individual in routinizing the activity. For example, for the growing child the problem of brushing one's teeth at night may be first one of maintaining a set (from the living room, where he is instructed, to the bathroom, where he must carry out the activity), later a problem of episodic remembering (occasional parental prompts may be helpful), and finally a matter of habitual remembering (the last thing to do before going to bed).

What are the means by which episodic remembering might be facilitated? A common strategy is to construct a list of activities to be carried out, and then to routinely examine the list in order to be reminded of what must be done. Such a procedure involves subordinating episodic to habitual remembering--the procedure is useful only if one frequently or regularly examines the list. A second mnemonic strategy is to create an external retrieval cue which can prompt remembering of the activity--e.g., putting the overdue book near the front door so it will be seen and returned to the library. Note that although habitual remembering

can involve integrating an activity (vitamin pills) within the stream of regular activities, episodic remembering can often depend upon a disturbance of the regular stream of activities--e.g., seeing the book by the front door. Third, there may be various cognitive strategies for facilitating prospective remembering, for example, forming elaborated associations between the activity to be remembered and other activities which might be engaged in at a future time--by this means, one might remember to bring the frisbee to the picnic.

To what extent do people use these various strategies in order to facilitate episodic remembering? A preliminary answer is provided by Kreutzer, Leonard, and Flavell (3), who asked children how they could be certain to bring their skates to school in the morning. The majority of the responses involved creating external retrieval cues, such as placing the skates in a particular location or leaving a written note, rather than cognitive processes; the responses of older children were more planful than those of younger children. Thus, not only is prospective remembering important for planned behaviors, as noted above, but planfulness seems a prerequisite for engaging in activities which might facilitate prospective remembering, e.g., making efforts to create external retrieval cues or cognitive associations now in order to better remember to carry out some action in the future. Planfulness has already been implicated in the intentional memorizing strategies which can facilitate retrospective remembering (1, 4).

In an investigation in which college students were asked to mail a series of post cards on specified dates, an arbitrary external retrieval cue--a tag fastened to subjects' key chains--facilitated prospective

remembering when the intervals between mailing dates were long, but not when the intervals were short (5). The purpose of the present investigation was to determine whether or not external retrieval cues could also facilitate the episodic prospective remembering of much younger subjects. Although the interview study of Kreutzer et al. indicates that even kindergarteners can imaginatively suggest the use of such cues, it is not clear that children of such an age can actually choose and benefit from external retrieval cues in prospective remembering.

Three possible differences between younger and older children in ability to use cues were investigated: (a) Younger children may be less likely than older children to construct a cue to facilitate their prospective remembering. Thus, in the cue condition the children were provided with an external cue. In the control condition, no cue was provided. (b) Younger children may be less able than older children to use a cue which they have constructed or which has been provided externally. In the elaboration condition, children who had been provided with a cue were coached in how the cue could facilitate their prospective remembering. (c) Younger children may be less able than older children to select a suitable cue, i.e., one which can elicit the associations which will lead to engaging in the appropriate activity. In both the cue condition and the elaboration condition, children were asked to choose from three possible cues the one which would best facilitate their prospective remembering. It was expected that, at least for the younger children in the study, prospective remembering would be greatest in the elaboration condition and least in the control condition. The older children were expected to be more able and more likely to construct and use appropriate

cues to facilitate their prospective remembering. These hypotheses and experimental conditions (control, cue, elaboration) are in some respects analogous to those which have played a role in elucidating the development of retrospective remembering. Differences (a) and (b), for example, correspond to production and mediation deficiencies, respectively (1). Alternatively, the three conditions will be seen to provide either no prompt, an explicit prompt, or an augmented explicit prompt for elaboration (7), and it can be hypothesized that for older subjects the less explicit prompts would be sufficient for elaboration and successful prospective remembering.

In this experiment children were asked to remember to take an envelope from the testing room and place it in a box as they returned from the testing room to the classroom. After the instructions had been given to the subject, a locus of control test was administered in order to provide an interval during which the subject might forget the prospective remembering task. A locus of control measure was chosen so that its relationship to prospective remembering might be investigated. The hypothesis was that children who were capable and efficient at remembering to carry out actions at appropriate times in the future would also perceive reinforcement contingencies as being under their own rather than external control.

B. METHOD

The subjects were 41 kindergarten children (mean age 5 years, 7 months) and 41 second grade children (mean age 7 years, 7 months), obtained from two elementary schools. Each subject was tested individually in an empty classroom at the school. As the first of two experimenters escorted the

subject to the testing room, he pointed out a bright orange "contest box" which had been placed in an alcove along the hallway. As they entered the testing room, the second experimenter was introduced, and together the second experimenter and the subject proceeded to the far corner of the room. The subject was then asked to draw a picture. As the picture was completed, the second experimenter complimented the subject on his picture and encouraged him to enter the picture in a contest. Together they put the picture into an envelope, and the experimenter said: "Remember the contest box which you saw on the way here? Well, when you go back to class, you can take your picture with you and put it in the box, OK? I'll put it over here so you'll be sure to remember." At this point the experimenter removed the envelope with the picture from the table and put it on a nearby counter where it was still visible but less obviously so.

For subjects in the control condition, the second experimenter and the subject then moved to a second corner of the room away from the envelope and away from the door where the first ten questions of the Stephens-Delys Reinforcement Contingency Interview (8) were administered. If this was completed in less than seven minutes, additional questions were administered until seven minutes had elapsed. At this point the first experimenter returned and announced that it was time to return to the classroom. As the subject rose from his chair, both experimenters were careful to allow the child to move either toward the corner of the room with his envelope or toward the door. If the child did not remember to retrieve his envelope and had moved approximately a third of the way toward the door, the first experimenter probed: "Are we ready to go?"

If the child still did not remember and had moved approximately two-thirds of the way toward the door, the experimenter probed: "Did you leave anything in the room?" Finally, if the child reached the door without remembering, the experimenter said "Don't forget your envelope." Thus, there were four possible outcomes: remembering without being reminded, remembering after a weak probe, remembering after a stronger probe, and forgetting.

In both the cue condition and the elaboration condition, after the first experimenter had removed the subject's envelope with the picture from the table, three possible cues for remembering were shown to the subject. These cues were drawings of a mailbox (the appropriate cue), a lamp, and a cup, on 10 cm X 12 cm pieces of paper. The subject was told "Here are some pictures that might help you to remember to put your picture in the box. Which do you think would help you to remember?" Although the experimenter was prepared to substitute the mailbox for the subject's choice if necessary, all subjects chose the appropriate cue. The subject then carried this cue to the corner of the room where the Stephens-Delys Reinforcement Contingency Interview was administered, and the cue was placed so that it would be easily visible to the subject as he answered the questions. The procedure for subjects in the elaboration condition was similar, with the exception that after the subject had chosen the appropriate cue, the experimenter asked "How will this help you to remember? What do you think of when you see it?" and encouraged the subject to formulate verbally the plan of action which the cue should remind him to engage in.

C. RESULTS

The data indicated whether each subject had remembered, responded to a weak or a strong probe, or forgotten to take his envelope as he left the testing room. Inspection of the data indicated that the majority of the subjects either remembered or forgot, and only 25% responded to the weak or the strong probes, so these two response categories were combined with the forgetting category. This provided a more satisfactory number of subjects in each cell of the analysis.

Remembering was more frequent for five-year-olds in the elaboration condition (57%) than in the cue condition (31%) and the control condition (21%). These differences are not significant, however. For the seven-year-olds, remembering in each condition was approximately the same (69% in the elaboration condition, 85% in the cue condition, and 67% in the control condition). A 2 X 3 X 2 (Age X Conditions X Remember vs. Forget) chi-square analysis (9) revealed only an association between age and remembering with the 7-year-olds more likely to remember than the 5-year-olds ($\underline{X}^2 = 11.10$, $\underline{df} = 1/5$, $\underline{p} < .001$). No relationship was found between scores on the Reinforcement Contingency Interview and remembering.

D. DISCUSSION

The analysis of the development of prospective remembering abilities in terms of the likelihood of utilizing external cues and the ability to use such cues did not receive support from the present data, for there were no significant differences between the experimental conditions, and in neither the cue condition nor the elaboration condition did as many younger children remember as older children did in the control condition. It was found that 5-year-olds can choose an appropriate mnemonic cue for

future action, at least in the present context, where the cue (mailbox) was quite related to the action (putting the envelope in a box) and the alternative cues were quite unrelated (lamp, cup). Hagen (2) has commented that it will be necessary to establish the relationship between responses obtained in interview studies, such as that of Kreutzer et al., and actual performances in situations requiring memory abilities. Although young children can suggest the use of external retrieval cues, and can choose appropriate cues, the present results suggest that they do not take advantage of such cues to facilitate their prospective remembering, at least when the task is to remember for seven minutes to obtain an envelope. The most outstanding finding was the significant development in prospective remembering ability from 5 years (only 37% remembered) to 7 years of age (73%). The older children had attended school for a longer period of time, and there is increasing evidence that formal schooling is important in the development of remembering abilities. It seems likely that prospective remembering abilities are required and thus develop at that age at which the child becomes able to make choices regarding alternative activities. Prior to this time, the child's activities are structured around daily events which he always participates in--getting up, mealtime, father's arrival home, going to bed, etc. Prospective remembering becomes a necessity when the child is given the freedom to choose between various activities--delivering a message, feeding the cat, stopping at the store on the way home from school, etc.

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